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The Influence of Historical Processes of Haiti and Japan on the Effects of the  
Earthquakes

By

Shoko Nakamura

A Thesis Submitted in Partial Fulfillment of the

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In

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This thesis has been examined and approved by the following members of the student's committee.

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**ABSTRACT**

Looking at the societies of Haiti and Japan after the earthquakes, the effects of the disasters to each society are not the same. This research paper discusses that the effects of a disaster on society are the result of social conditions. Utilizing the theories of world-system perspective and risk society, this paper tries to understand how historical process contributes to contemporary social structure and how a holistic approach is important to the discussion of different experiences of the earthquakes in Haiti and Japan. As a method, comparative historical method is utilized with the focus of within-case method, and major sources for this research are collected from historical documents from both primary and secondary sources. Discussions include brief histories of Haiti and Japan, the world position of Haiti and Japan within world-system perspective, the effects of the earthquakes occurred in Haiti and Japan, and different experiences and effects of the earthquakes on each society as well as their struggles.

## INTRODUCTION

Natural disasters, such as hurricanes, earthquakes, tsunamis, floods, heat waves, and volcanic eruptions have been observed in every society in the world. One of the characteristics of those natural disasters is that it is not fully possible to anticipate the occurrence of a disaster even with highly developed scientific technologies today. Also, natural disasters do not differentiate the time and area they occur, therefore almost every society experiences disasters based on the geographic features of the land and the social organization in relation to the land.

In 2010, Haiti experienced an earthquake and Japan experienced it the following year. An earthquake is a natural disaster which many countries in the world experience. However, the experiences of Haiti and Japan were not the same because their specific infrastructural problems and effects on the population were very different. This paper argues that disasters are neither naturally made nor simply environmental phenomena. Disasters differ in every society since the effects of a disaster on society are the result of social conditions. To argue this, world-system perspective and the theory of a risk society help understand the different outcomes resulting from Haiti and Japan's earthquakes.

### *Background*

An answer for the question, "What is a disaster?," has been debated among social scientists who have contributed in different ways to conceptualize disasters and their characteristics and influences on society. Kreps (1998:31) argues that when defining disasters, they have been interpreted as "systemic events and social catalysts." Disasters are systemic events because they are dramatic historical happenings as well as nonroutine, and disasters are social catalysts because they force collective reactions

(Kreps 1998). According to Kreps (1998:34), disasters are “nonroutine events in societies or their larger subsystems (e.g. regions, communities) that involve social disruption and physical harm.”

In addition, he also emphasizes four dimensions along with defining disasters as events; they are (1) length of forewarning, which is the amount of time spent to identify a disaster and its effects on a location, (2) magnitude of effect, which refers to the degree of physical harm and social disruption, (3) scope of effect, which is social and geographic framework of physical harm and social disruption, and (4) duration of effect, which is a time period until a disaster is no longer defined as producing the physical harm and social disruption (Kreps 1998:34).

Therefore, his argument sustains the point that disasters are associations of historical happenings which include the core dimensions of physical harm and social disruption (Kreps 1998, 1984). His argument also includes disasters which are considered man-made/technological hazards, such as the nuclear power plant accident at Three Mile Island, the meltdown at Chernobyl, economic depressions as well as global warming (Kreps 1998, 1984).

Unlike Kreps whose main focus is on physical harm and social disruption when defining and analyzing disaster events, Hewitt (1983) has a more macro-level perspective on natural disasters and its social relations. Hewitt (1983; 2007) criticizes the dominant view of disaster research which argues natural disasters result from extremes or accidents in geological feature. The dominant view interprets the nature of storms, earthquakes, floods, and drought as “potential damage” to the human community, especially those who are “vulnerable” (Hewitt 1983:5). Those hazard events are “described as ‘unscheduled’



and defined by objective uncertainty” (Hewitt 2007:49). The prediction of hazards and disaster reductions, for the dominant view, are expected to be based on the latest scientific knowledge and techniques of forecasting, such as monitoring, data processing, and mathematical skills which are provided by technocratic agencies (Hewitt 1983; 2007).

Opposed to this view, Hewitt (1983) argues that natural disasters are not explained by geophysical processes, and the damage, or human responses to disasters, are not dependent on the geophysical processes. Instead, natural disasters are interpreted as having the larger framework of historical circumstances, such as the ongoing social order, everyday interaction with the habitat, or the structure of human-environment relations. When analyzing natural disasters and its effects, it is necessary to pay attention to the historical interactions which have been shaping the consequence of disasters (Hewitt 1983; Oliver-Smith 1994). Hewitt (1983) claims that the damage to our society from most natural disasters are ‘characteristics’ rather than accidental events as the dominant view argue; the risks, pressures, and uncertainties including awareness and preparedness for natural disasters, are discussed as a result of “ordinary life” instead of events which rarely happen.

Since natural disasters are interpreted to be characteristics of societies, social order should be the central theme when discussing the causes of disaster and risks from nature (Hewitt 1983). Social order includes the process and exercise of political and economic power, regarding its level of vulnerabilities and institutional performance, which functions as management when reacting to disasters (Hewitt 1983). Therefore, this perspective maintains that disasters are not accidents that cause massive damage to

society, instead disasters are caused by the social order (Oliver-Smith 1994). In his view, most disasters are not disasters because of the damage they cause. Disasters do not occur except as a direct result of characteristics and vulnerabilities developed by humans in the framework of the historical process (Hewitt 1983; 2013). Hewitt (2013:5) states, “A disaster comes about from the destructive interactions of environmental hazards, peoples’ exposure, vulnerability, and absent protections. At root, understanding depends upon tracing out and explaining just how damages occur, where and to whom.”

For example, Hewitt (2007; 2013) points out the fact that more women died in communities when the Indian Ocean tsunami happened in 2004, and more women and elderly were also killed in the Kobe 1995 earthquake. The social explanations of these unequal losses are related to specific historical and cultural conditions developed in modern society. Those characteristics risk some people’s lives with larger losses than others (Hewitt 2013).

Oliver-Smith (1998) argues that an adequate definition of disasters should emphasize multidimensionality, and disasters as totalizing events. A disaster is “a collectivity of intersecting processes and events, social, environmental, cultural, political, economic, physical, technological, transpiring over varying lengths of time” (178).

Oliver-Smith (1998) focuses on the feature of multidimensionality and human-environment relations when defining disasters and its effects on society. When analyzing disasters, he considers, from an ecological perspective, a society’s total adaptational strategies (Oliver-Smith 1998). He argues that the development of a society stems from the development of its environment and the consequences of the interactions between societies and its environmental relations; thus, similar to Hewitt’s argument, societies are

deeply influenced and modified by their historical environmental relations, and are profoundly conditioned by the histories of societies (Oliver-Smith 1998). The links between a society and its environment cannot be separated because doing so would remove a society from the history that produced it (Oliver-Smith 1998).

Oliver-Smith (1998) stresses the influence of a disaster's historical aspects on society today by arguing "a disaster is made inevitable by the historically produced pattern of vulnerability, evidenced in the location, infrastructure, sociopolitical structure, production patterns, and ideology, that characterize a society" (187). Patterns of vulnerability, planning, warning, evaluation, reconstruction and planning for earthquakes and nuclear accidents are conditioned historically and within societal-environmental relations (Oliver-Smith 1998). According to him, historical concepts and environmental features influencing society must be included when defining disasters and attempting to examine their effects on society (Oliver-Smith 1998).

### ***Disaster and the Historical Relation: Disasters in Central and South America***

In his study of the earthquake in the north-central coastal and Andean regions of Peru, Oliver-Smith (1994) described it as "Peru's five-hundred-year earthquake." He claims that the earthquake that occurred on May 31<sup>st</sup> in 1970 could be considered as a disaster event which originates in its vulnerabilities and possible damage since the conquest and colonization of Peru over 500 years ago (Oliver-Smith 1994).

Oliver-Smith (1994) discusses the Andean people's adaptation to hazards in the pre-Columbian Andean. The features of their building techniques and materials employed showed that pre-Colombian Andean people carefully bonded each corner of the walls of Incan buildings, utilized long vertical joints in houses, and employed a technique known

as 'English bond' which had adobe in the construction of their houses. Adobe is considered an important building material as well as stones when building rows (Oliver-Smith 1994). This technique of Incan people is thought to be far superior to the best Mayan or Mexican construction (Oliver-Smith 1994).

In addition, Oliver-Smith (1994) points out the most significant feature of their buildings is their thatched roofs. Even if their building techniques were not necessarily anti-seismic, the thatched roofs functioned to avoid collapsing heavy roofs when an earthquake happens. Also, their walls were built by utilizing a double structure with trapezoidal-shaped doors and windows (Oliver-Smith 1994). The houses constructed with thin walls built by stones and mud or adobe were about the height of a man, and this implies that they could avoid possible harm which would happen from collapsing houses or falling debris as a result of large earthquakes (Oliver-Smith 1994).

After arriving in Peru in 1530s, Spaniards attempted to control the Andean people. They extracted the surpluses and enforced mass involuntary migration to place people into new planned communities for the purpose of controlling them more efficiently and bureaucratically (Oliver-Smith 1994). In the new communities, Spanish techniques of building and construction design were adopted (Oliver-Smith 1994). Although houses used to be spaced out with long paths, when Spanish settlement design was utilized, it was changed to the grid pattern of perpendicular streets organized around a central plaza (Oliver-Smith 1994). These streets were likely to be narrow and houses were built close to each other (Oliver-Smith 1994). Oliver-Smith (1994) points out a feature of those Spanish houses as the most dangerous of changes; they adopted the ceramic barrel roof tile in addition to those materials they used to use, such as stones,

adobe, and thatch. He argues that these narrow, perpendicular streets, and one or two story houses with ceramic tile roofs have created a possibly extremely dangerous situation due to the vulnerable construction on the seismically active land (Oliver-Smith 1994).

When an earthquake hit the region, because of the extreme weight of the ceramic tile, roofs fell on the narrow streets resulting in a large number of people buried when they remained within the buildings or attempted to escape (Oliver-Smith 1994). Also, since the Spanish conquest and colonization changed Andean people's political and socio-economic patterns, systemic hardship and gaps between the wealthy and poor developed (Oliver-Smith 1994). Oliver-Smith (1994) argues that this social system, which they were forced to adopt, resulted in maldistribution of aid after the earthquake. It was rooted in the urban social class systems and the ideologies of racial and cultural biases against indigenous populations.

He concludes his argument that the devastation due to the earthquake in Peru was "a product of the historical processes set in motion at the time of the conquest" (Oliver-Smith 1994:46). Over 10,000 years of habitation in the regions, Andean people had already acquired, in their culture and construction skills, effective adaptation to natural disasters. Their social vulnerability had been accentuated because of the conquest of Spaniards and the adaptation to their system and technique (Oliver-Smith 1994).

### ***The Statement of Problem***

Based on the different perspective outlined above, there are several approaches to understanding a disaster. According to Rodriguez and Russell (2004), it is important to know "disasters do not happen 'overnight' but are 'in the making,' as a result of the

cultural, historical, political, and economic processes that have shaped our societies” (195). Since each society has different cultural, historical, political and economic processes, different experiences of different societies, communities, or states are easily anticipated when a disaster occurred.

As Oliver-Smith (2002) discusses, except for a few researches, when disaster related problems are explained, the cultural, historical, political, and economic factors are rarely analyzed in any detail or depth (23). A part of the problem is that “disaster is often considered an event rather than a process” (23). As supported by the Peru’s earthquake’s example of Oliver-Smith (1994) explains how the nation’s historical process is significantly influential to a consequence of a disaster, thus a holistic explanation to the degree of a disaster’s devastation is necessary when one attempts to fully understand why nations react differently when a disaster occurs.

### ***Research Objectives***

This research investigates the importance of historical factors for different societies after a disaster. This research stresses the influence of historical processes of Haiti and Japan on the effects of the earthquakes in each society and helps to understand how historical process contributes to contemporary social structure and how a more holistic approach is important to the discussion of different experiences of the earthquakes in Haiti and Japan. Utilizing Wallerstein’s world-system analysis, this research investigates a holistic explanation of how the earthquakes affected the physical conditions and the social structure in each country along with the possible continuous struggles each country must face.

### ***Research Questions***

This research investigates and address these questions: (1) What is the role of historical processes in becoming core and periphery nations for contemporary society in Haiti and Japan? (2) How does each country's experience of a natural disaster, in this case the earthquakes, differ in Haiti and Japan based on the notion of core and periphery? And, (3) Does core nation status lead to issues associated with a risk society, and how its status is relevant to the notion of risk society during a disaster?

## **LITERATURE REVIEW**

### ***Theoretical Approach: Risk Society***

The concept of risk society, according to Ulrich Beck (1986), describes risk as man-made risks that we encounter as a consequence of industrial society and those decisions made in the use of techno-economic advantages. The concept of risk has a wide historical framework in which Beck includes three different periods from pre-industrial society, industrial society, to risk society (Mythen 2004). He argues that our society has shifted from the industrial society to a risk society where “we were no longer threatened by strange and violent nature, but by ourselves and our financial and technological success in overcoming nature” (Beck 2011).

The risks, in the concept of risk society, are associated with environmental risks, such as air pollution, chemical warfare and biotechnical production (Mythen 2004). Beck (1986; 2006) distinguishes between catastrophe and risk and states that “risk does not mean catastrophe; risk means the *anticipation* of catastrophe” (2006;332). The risks in risk society are different from those effects that people experience from plagues, famines, and natural disasters (Beck 1992; Mythen 2004). Therefore, “Risks are always events

that are threatening. Without techniques of visualization, without symbolic forms, without mass media etc., risks are nothing at all. In other words, it is irrelevant whether we live in a world which is in fact or in some sense ‘objectively’ safer than all other worlds; if destruction and disasters are anticipated, then that produces a compulsion to act” (Beck 2006:332, 2011:665). The industrial risks are caused by the potential problems of the incalculability, industrial or techno-scientific activities (Beck 1992).

Beck (1992; 2006; 2011) argues three features of risk.

1. *De-localization*: its causes and consequences not limited to one geographical location or space, they are in principle omnipresent.
2. *Incalculableness*: its consequences are in principle incalculable; at bottom it is a matter of ‘hypothetical’ risks, which, not least, are based on science-induced not-knowing and normative dissent.
3. *Non-compensatibility*: the security dream of first modernity was based on the scientific utopia of making the unsafe consequences and dangers of decisions ever more controllable; accidents could occur, as long as and because they were considered compensatable. If the climate has changed irreversibly, if progress in human genetics makes irreversible interventions in human existence possible, if terrorist groups already have weapons of mass destruction available to them, then it is too late. Given this new quality of ‘threats to humanity’ – argues Francois Ewald – the logic of compensation breaks down and is replaced by the principle of *precaution through prevention*. Not only is prevention taking precedence over compensation, we are also trying to anticipate and prevent risks whose existence has not been proven. (2006:334, 2011:665)

Beck (2006) discusses that the irony of risk is that we cannot calculate and control the risks, neither can we rely on experiences from the past; therefore, the effort of monetary compensation would not function after a worst accident and failure. Risks caused by industrial hazards and damages that we encounter in the risk society are beyond our estimation and remain uncertain and obfuscated in the calculation of accidents (Beck 1992). This is why Beck (2006) argues that risk is ambivalence (330). In the process of industrialization, we have prepared for the worst case by calculation and control.



However, what we still encounter is “the discovery of the importance of non-knowing” (Beck 2011). After the discovery, we attempt to renew, deepen and expand our knowledge, control and security, but the irony of risk is that we still have to deal with something we do not know if it exists (Beck 2011).

Perrow (1984) has a similar argument based on risks in our industrialized society. When he discusses accidents in our technological systems, he labels them as high-risk systems because these systems have high possibilities to cause accidents. Those accidents caused within the high-risk systems are called normal accidents by Perrow; since the systems which people have been dealing with are very complicated, people cannot avoid accidents associated with those highly technological systems. Thus, according to Perrow (1984), accidents are inevitable and people can expect them to happen normally.

Beck (1986) claims that the notion of risk is directly related to the notion of reflexive modernization. Beck (1986) states that modernization is becoming “reflexive; it is becoming its own theme” (19). This implies that questions of the development and employment of technologies are deeply covered by questions of the political and economic ‘management’ of the risks of technologies (Beck 1986). The manufactured uncertainty stems from decision making processes and “endogenous entities” (Mythen 2004:16) which are practiced by people, firms, state agencies, and also politicians (Beck 1992). As opposed to the threat and natural hazards which people used to encounter, these manufactured risks happen in the process of development of modernization (Beck 1986; Mythen 2004). The manufactured uncertainty does not happen accidentally, but systematically, caused by the basic institutions of science, firms, the states, and even the military (Beck 2006). Reflexive modernization means that “we are not living in a *post-*

modern world, but in a *more*-modern world. It is not the crisis, but the *victory* of modernity, which, through the logics of unintended and unknown side-effects, undermines basic institutions of first modernity” (Beck 2006; 338). The manufactured risks and uncertainty with the threats of encountering not-knowing side effects and unpredictable cause could not be interpreted as an onward process or positive experience for further development of modernity, but it is reflexive, something we need to deal with in return.

Beck (1986) continues his argument with paying attention to the nuclear age understanding that nuclear energy has *catastrophic potential* because of its effect on large segments of the population. It does not matter how small an accident would be because the effects would be too large, and one accident implies annihilation (Beck 1986). Beck (1987) published an article shortly after the nuclear accident at Chernobyl and discusses the nuclear age that we live in and its risks. He argues that the accident at Chernobyl makes us conscious about the nuclear age and what has been threatening us for a long time (Beck 1987). According to him, our relation to reality has been fundamentally transformed because of “the industrial universalization of chemical poisons in the air, the water, and foodstuff as well” (155) along with the nuclear age. The accident of Chernobyl is one of the great examples which represent the nuclear age and its risks which we encounter. Beck (1987) argues that the nuclear age symbolizes “the end of perceptiveness and the beginning of a social construction of risk realities” (156). People have been depending on the success of scientific and technical-economic development, but at the same time, this development has just been a construction of risk itself.

In terms of de-localization, the cause of radiation does not have a limit. Space, time and social differentiation have gone beyond those limits; therefore, the effects of the accident at Chernobyl can last for a very long period, and they can be a global phenomenon (Beck 1987). The consequences of Chernobyl disaster are incalculableness and non-compensability; although people have prepared for the worst-case scenario, the probability of such a disaster cannot be covered in the usual way by an insurance company, because the cause was something they did not anticipate, and could not anticipate; they did not exactly know how to deal with the situation. This would have to be based on “the scientific utopia” (Beck 2006;334, 2011;665) which makes the unsafe consequences and dangers controllable.

Perrow (1984) also argues that living with high-risk systems (nuclear power, nuclear weapons and recombinant DNA) implies that we live with catastrophic potential for those victims who are innocent bystanders and future generations; therefore, it would be possible to have no boundaries to these catastrophes in terms of space and time. In addition, once the risks associated with the nuclear energy happened in reality, the way they deal with it is significantly influenced by those who determine decisions politically, economically, and socially.

In this risk society, what we have been experiencing has global effects, therefore even people who live in other nations cannot speak of it as “the internal affairs of another country” (Beck 1987:159). The argument of Beck on risk society emphasizes that risks are byproducts of what we have decided in the process of industrial and economic development. Our society has been developed with the efforts of improving our lives technologically and scientifically; however, it contains risks which have global effects

and do not have limitation in time and space. Even people who are outside of a nation need to be seriously considered. For example, we have been experiencing the economic and industrial usefulness of nuclear power, but we do not have any solutions to deal with the contamination of vegetables and milk (Beck 1987). The standards of normality and the basis for calculating accidents are abolished in a risk society (Beck 1992). This leads to a question of its effects like the accident at the Chernobyl nuclear power plant.

One important feature of risk society is that its concept is highly, and almost only, related to high levels of modern technology and industrialization. This means that some of the highly-industrialized countries are considered risk societies, but some other developing countries are not. Beck's concept of risk society helps us understand highly industrialized society with nuclear power like Japan and existing great differences between those with modern technology and those unable to afford modern technology. His concept is very important to facilitate understanding when comparing societies of Haiti and Japan.

### ***Theoretical Approach: World-System Perspective***

When a natural disaster occurs, a low-income country with less economic stability and resources, as well as an ill-equipped organizational structure, would experience greater consequences, and the country would start to experience severe difficulties in the disaster response and recovery (Rodrigues and Russell 2006). Compared to a low-income country, a high-income country would have fewer difficulties in a shorter recovery period because of its economic stability and extensive social and political structure. Rodrigues and Russell (2006) conclude there are differences between low-income and high-income

countries in response to a disaster due to the social and political structures, economic opportunities, and demographic characteristics.

Collins (2009) argues that vulnerability to disaster could happen due to underdevelopment, which is defined as “a situation in which poverty creates both social and economic susceptibility” (28). Importantly, Collins (2009) discusses that vulnerability can also be induced by development as well. It is not only underdevelopment, but also development can possibly increase disaster risk or human vulnerabilities due to, for example, mass displacements through industrialization, social and economic collapse, and environmental degradation; therefore, both development and underdevelopment contain possibilities to create risks and vulnerabilities caused by disaster events (Collins 2009).

Although uneven relations between the low-income and high-income nations would cause the increasing vulnerabilities in the low-income nations, the high-income nations also face the challenge of reducing disaster risks (Collins 2009). Since disaster risks have their origins in global economic crises or macro-environmental processes, it is especially the high-income nations which could face a disaster covering a large part of the world on short notice (Collins 2009). Therefore, it is significantly necessary to maintain an assumption that it is not only low-income nations which encounter severe difficulties in responding to a disaster, but also high-income nations due to their highly industrialized social structure. In addition, Oliver-Smith (2013) states “disaster risk and social vulnerability are in large measure the products of historical and existing processes of social and economic development” (280). Oliver-Smith’s ideas indicate the importance

of pursuing a historical approach to a current disaster event, and a holistic idea of its social environment.

In this context, the focus of this study is to understand how historical events inform a nation's current position and disaster vulnerability today. This study compares Japan and Haiti's response to the earthquakes. Their positions in the world-economy can help understand the different social conditions after the earthquakes in Haiti and Japan.

Wallerstein's world-system analysis explains and facilitates understanding the different paths of development between Japan and Haiti. Wallerstein's world-system analysis is a theoretical approach which provides understandings of relational concepts between each nation's positions in the world-economy and the process of how it has reached its positions. One of the important aspects of world-system analysis is that it emphasizes the significance of historical analysis; it requires a long-term, large-scale, and holistic approach to examine social occurrences (Jang 2004).

Wallerstein (1974) describes a world-economy as "a single division of labor but multiple polities and cultures" (31). In the world-system perspective, the world is unified by neither political nor cultural hegemony. On the other hand, the world-economy contains many political systems, cultures, and ethnic groups including religion, language, and traditions (Wallerstein 1974; 2004). Instead of political power or cultural hegemony to unify the world economy, what unifies the world as a structure is the division of labor which connects the world internally in a large geographic zone (Wallerstein 2004).

Wallerstein (1979) argues that the concept of class, such as bourgeois and proletarian, is historically developed with its specific background of the capitalist mode of social organization. Class analysis is only meaningful when it is perceived from and

within the historical context (Wallerstein 1979). World-system analysis points out wage labor is only one of the many factors of labor control within a capitalist system; instead, it is the class struggle and all other kinds of social struggles which should be understood and evaluated in the world-system as a whole (Wallerstein 2004).

The inequitable relationship between nations in the world-economy is at the center of world-system analysis. The theoretical concepts of core and periphery processes indicate the position of a nation in the world-system, and its distribution is founded geographically through the process of exploitation of periphery and unequal exchange by core nations (Prew 2010).

Unequal exchange occurs due to an axial division of labor between core-like production processes and peripheral production processes, and the core-like production processes are high profit (Wallerstein 2004). Under world-system analysis, the production processes determine core-like or peripheral-like status instead of the state, political, or cultural hegemony (Wallerstein 2004).

Under the notion of the world-system perspective, unequal exchange, which is a structure of world economy, produces international inequality (Mahutga 2006). From unequal exchange, core nations maintain advantages over periphery nations, and the international division of labor allows those powerful nations to maintain control over other nations in a world-economy because a capitalist world-economy separates productions into core-like and peripheral products (Prew 2010; Mahutga 2006; Wallerstein 2004). As a result, unequal exchange between core-like and periphery-like products results in a flow of surplus-value to the core and providing a large amount of profit from multiple local producers (Wallerstein 1974; 2004).

In the framework of the capitalist world-economy, the major characteristics of core nations are high wage, high technology, and high-profit. On the other hand, the characteristics of peripheral nations are lower wage, low technology, low-profit, and less diversified production (Wallerstein 1979). Under the core-periphery relational concept of world-system perspective, periphery nations are usually subject to greater competition because products are in a weak position in the market in the process of exchange compared to quasi-monopolized products, which core nations produce (Wallerstein 2004). Because of unequal exchange, those periphery nations become weaker in the world-economic system when core nations replace their products with more advanced technology (Prew 2010; Wallerstein 2004).

Periphery nations tend to be weaker and have less ability to influence surplus value in the market since capital is concentrated in the core areas which acquire the abilities to create strong state-machineries based on both the financial base and the political strength (Wallerstein 1983). Those core nations are able to pressure weaker nations to accept rules related to lower down the hierarchy of commodity chains, including lower-paid-work-forces and household structures to permit such work-forces to survive (Wallerstein 1983: 31). These were the paths to historical levels of wages which has created significant divergence and unequal exchange between areas in the world-system (Wallerstein 1983). Wallerstein (1983) argues that these processes are usually hidden, and prices of commodities are likely to be negotiated in a world market based on the structural hierarchy and economic forces.

In the core nations under the world-system, Prew (2010) points out that the process of high technology in core nations is designed to increase the rate of profit for



further economic expansion by increasing production efficiency. Utilizing energy intensive machines and the speed of production lines are examples of substituting human labor in order to increase efficiency (Prew 2010). This implies that in core nations, technology is substituted for natural processes, and they try to maintain the rate of production by being very energy intensive including the use of natural resources, such as carbon dioxide emitting resources like natural gas, oil, and coal (Prew 2010).

In an effort to produce more commodities with greater efficiency, core nations face the increase of environmental degradation through increasing efficiency with their advanced technologies (Prew 2010). Prew (2010) points out that “The existence of high technology and quasi-monopolies characteristic of core processes are a necessity to facilitate economic expansion and core dominance, but result in the more intensive use of nature’s products” (168). There is a strong correlation between development of technology, industrialization, and its effects toward the environment.

The division of the world-economy into nations characterized by core processes and others by periphery processes provides one of the fundamental social circumstances influencing the effect of disasters on society. Core processes as high technology, are precisely the context of industrial societies that produce the risk (Beck 2006) that lead to “normal accidents” (Perrow 1984). Core or periphery status in the world-system provides a social context of disaster as outlined by Oliver-Smith (1994). Given that core nations are dominated by high technology, disasters should be influenced by these core processes. Likewise, the low technology, peripheral nature of other nations will influence the outcome of their disasters.

As Collins (2009) discusses that both development and underdevelopment contain possibilities to create risks and vulnerabilities due to their developmental characteristics. Looking at historical processes of Haiti and Japan, which are two very different countries under the concept of the world-system perspective, would lead to different outcomes in the society after the earthquake. Utilizing the world-system analysis can aid the interpretation of different effects of the earthquakes on each country.

### ***Historical Background of Haiti***

Considering Haiti's history, Beckford (1972) argues Haiti's plantation system is a historical process underlying its "persistent poverty." In order to view a plantation as a system with the purpose of exploitation, Beckford (1972) points out two main systematic dimensions. They include the internal dimension which refers to a social system within a nation, and the external dimension which refers to an economic system both within a nation and in wider world communities (Beckford 1972). In the external dimension of an economic system, two characteristics are interrelated which are a nation's export orientation and foreign ownership (Beckford 1972). Beckford (1972) argues that plantations were/are "the product of metropolitan capital and enterprise" (11), and it implies that plantations are sources of macro level economics with a variety of ways. A plantation within a nation is only a part of metropolitan capital which bonds to a wide world of economics and industries, and they consist of a set of economic relations at the macro level (Beckford 1972). Therefore, Beckford (1972) argues that "plantations are dependent" (11) on the relations of controlling and being controlled in terms of property ownership, financial decisions, and political connections.

Beckford (1972) argues that societies like those in the Caribbean were comprised of less organized indigenous populations which allowed European invaders to destroy their societies and massacre their populations. Wallerstein (1974; 1980) also points out that Northwest Europe emerged as a core area first in the world economy and Eastern Europe and the Western Hemisphere were once peripheral areas. Nations with more power sought to feed on weaker colonial powers because it was an easy way to take and obtain the economic advantages already established by the nations. In the case of Haiti, the authoritarian ruling structure was established and reinforced by the French (Shamsie and Thompson, 2006).

France maintained Haiti as a colony until 1794, the year France abolished slavery (Dubois 2012, Trouillot 1990). Girard (2005) notes that Haiti was France's most valued colony since a half of Europe's consumption of sugar and coffee was dependent on Haitian exports, especially when the French Revolution started. Coffee exports increased tremendously and were sold in the Western world. By 1859, Haiti was the fourth largest coffee producer in the world after Brazil, Java, and Ceylon, and 70% of coffee exports were constituted by Haiti (Sheller 2000). Haiti had world production records for both sugar and coffee, which made it the most profitable colony in the world from the point of view of French mercantilists (Trouillot 1990). Other small exports were cacao, indigo, molasses, hides, tortoise, horns, and wax (Sheller 2000).

Although Haiti is one of the unique nations which acquired independence from France after the revolution, their failure of self-autonomy and political and civil control are often discussed (Sheller 2000). Beckford (1972) points out that, many times, forces inherent in the plantation system when its destruction occurred do not have a strong effect

on developing self-autonomy. The French control in Haiti's plantation system did not result in developing Haiti's self-control in terms of political, economic, and civil control; instead, the result was the modification of its system rather than total destruction of French forces (Beckford 1972). Beckford (1972) argues that the modification had effects on materialistic improvement in the plantation society, but it usually hardly changed people's basic psychological and cultural dispossession. Revolution like Haiti's success had not fully facilitated Haiti to develop its own political, economic, and cultural control because of the "dynamic equilibrium of underdevelopment" (Beckford 1972:213) that is prevalent in a plantation society.

After Haiti won independence in 1804, the small number of elites, who were likely to be mulattos, in the capital retained their French culture while the majority of populations who were peasants retained their African culture and religion (Mitchelle 1967; Sheller 2000). Sheller (2000) points out the post-independence government in Haiti was mostly occupied by those elites who spoke French and followed French philosophical tradition and culture. The gap between the elites and local black populations stemmed from imbued sense of national and racial identity existing among those lighter skinned elites (Trouillot 1990). Those lighter skinned elites, who were likely to be mulattoes and their progeny, treated local blacks with disrespect while maintaining the political power and right to prescribing those local blacks (Trouillot 1990). Trouillot (1990) discusses that Haiti's political independence only increased the gap between those leaders and producers. The disagreements between those two groups were about both the politics and the land (Trouillt 1990, Caster 1992).

Although they have achieved independence, the illiteracy rate remains one of the highest in the world largely since there was no public school at that time (Mitchelle 1967). Education was mostly based on the French style, and those who were able to receive it were only elites (Mitchelle 1967). There was a big gap between elites and peasants in terms of education, economics, and culture in Haiti, and the majority of Haiti's population, peasants, remained illiterate (Mitchelle 1967).

Beckford (1972) considers the entry of the United States into the Caribbean and Central America as the new imperialism for the purpose of searching for raw materials. The imperialism of the United States had a significant effect on Haiti's plantation economy in the twentieth century (Beckford 1972). Sugar had been produced in Haiti during and after the French colonization, but it was especially during the United States' occupation between 1915 and 1934 when the United States' expansion of the sugar plantation industries, and plantations, were developed (Beckford 1972).

The occupation of the United States into the Caribbean area started with commercial adventures but also included territorial acquisitions and political intervention as well as military invasions (Schmidt 1971). Schmidt (1971) discusses that the presence of the United States in Haiti was materialistic rather than idealistic. America's efforts to civilize Haiti were to achieve material and technical development, to enhance organizational efficiency, and to develop a pragmatic attitude rather than spiritual (Schmidt 1971). The United States' occupation enhanced the construction of roads, hospitals, and public buildings, but the efforts of the United States were largely unsuccessful due to racial and cultural prejudices and tensions which impeded the

development of a relationship between masters and disciples (Schmidt 1972, Trouillot 1990).

Trouillot (1990) points out Haiti's two major economic problems caused by the occupation of the US. During the US occupation, it increased economic dependence by expanding coffee exporting business, and it also increased the injustice in the fiscal system; the US raised the share of the value of both imports and exports through customs duties (Trouillot 1990). Haiti's economic situation was worse in the end of the US occupation compared to earlier (Trouillot 1990). Between 1916 to 1921 and 1932 to 1933, coffee increased its value from 67 percent of exports to 78 percent; this implies that it increased the dependence on commodity products instead of several other products/crops cultivated by a few other plantation groups (Trouillot 1990).

Coffee occupied 74 percent of all the exports at that time (Trouillot 1990).

Trouillot (1990) argues that the US also benefited from Haiti facing a trade deficit since the US remained one of the major source of Haiti's imports. In the final year of the US occupation, custom duties had an important role for the government; it provided 80 to 83 percent of government revenues (Trouillot 1990). Import duties increased from 23 percent of the value of the merchandise in 1916 to 1917 to 46 percent in 1932 to 1933, which implied the US was forcing the burden on the producers and buyers of Haiti (Trouillot 1990). Export duties also increased from 19 percent to 28 percent in the same period (Trouillot 1990). This fact indicated that the tax burden on the peasantry and the lower classes was significantly heavier during the US occupation compared to the nineteenth century (Trouillot 1990). Trouillot (1990) discusses "dependence and the

extraction of a massive quantity of peasant surplus by nonproducers” (103) as Haiti’s most important economic problem under the US occupation, economic centralization

Economic centralization was one of the significant results of the US occupation. (Truillot 1990). It increased the role for Port-au-Prince which supplied 47 percent of customs receipts, meaning 69 percent of imports and 23 percent of exports, by the fiscal year 1932-1933; this was greater compared to less than 30 percent before the occupation (Truillot 1990). Truillot (1990) discusses that this economic centralization encouraged the homogenization of merchant and political groups in the capital and to reinforce their power. This was also when military started to gain more power (Truillot 1990). Emphasis on economic improvement, imports and exports, had been stressed during the US occupation of Haiti along with its increase of political and military power.

In 1920s and after World War II, Haiti had been more dependent on external funding along with its decline of agriculture and capitalist enclaving (Castor 1992). Haiti had not been able to build an agro-industrial infrastructure to develop their overall economy, nor achieve autonomy (Castor 1992). Assembly industries had grown since the 1970s, but they did not make much difference. The utilization of an accumulation model based on super-exploitation of labor, which contained low wages, no social security, and prohibition of bargaining rights, had not led to an improvement in Haiti’s economy, and it caused a struggle to survive under the difficult conditions and lack of revenue (Castor 1992).

Kawakita (2016) also argues that although Haiti is one of the unique nations which acquired independence from France after the revolution, it did not have the prospect for development of its own economy and autonomy. Haiti’s future was limited

because its revolution was only anti-world-system within the great force of the world-system. Also, Westerners in the plantations, living either with plantation workers or not, was an important aspect to move to a semi-periphery position from the periphery since its infrastructure was more likely to be developed by those Westerners, like the colonial history of the US for example (Kawakita 2016). Haiti's land was only used for plantations without developing its infrastructure, and it was a portion of the reasons it remained as a periphery after the revolution (Kawakita 2016).

### *Haiti as a Periphery Country*

Haiti is currently the poorest country in the Western Hemisphere (World FactBook 2014). 80% of population are living under the poverty line, and 54% in abject poverty (World FactBook 2014). Several factors influence the severe poverty and hinder the country's development. Haiti's life expectancy at birth is 63.1 years old, which is slightly lower than other Caribbean countries at 74.6 years old (World Bank 2013). Their unemployment rate is 40.6 %. People who do not have formal jobs occupy more than two-thirds of the labor force (World FactBook 2014). Their current severe situation is significantly related to Haiti's colonial past which has negatively affected it politically and economically.

Regarding the division of wealth and poverty, differences of power and access to opportunities directly influence the development of human capital and society. According to the world-system perspective, a major feature of periphery countries is that they are politically weakest compared to other core and semi-periphery countries (Wallerstein 1980). Haiti's current situation reflects the criterion of periphery nations that argues the ruling groups in core and semi-periphery nations seeking to maintain their control of



periphery nations' production and employment (Wallerstein 1980). This factor maintains Haiti as one of the periphery countries struggling to develop its autonomy. The core and semi-periphery nations retain their ruling control in periphery nations simply because they continue to need certain products which they ecologically find difficult to extract on their own land and also because of the cost of labor which is significantly lower than in the core or semi-periphery nations (Wallerstein 1980). The relations with core nations maintain periphery nations in the condition of underdevelopment. Even though Haiti is one of the unique nations succeeded in its independence and abolition of slavery, its relation to the core nations, especially France and the United States, had a significant effect on their political, economic, and social situation today. Haiti is a periphery nation which struggles with significant difficulties in developing its own political and economic stabilities for its growth.

### ***Historical Background of Japan***

In the discussion of Japanese development and modernization process, the Meiji Restoration was often argued to be a focal point of Japanese economic development (Tabb 1995; Hirakawa 1989; Crawcour 1989). Before the Meiji Restoration, Japan was a closed nation for about 200 years under the Tokugawa Regime (Tabb 1995). In 1640, Japan closed its country and ended all foreign contacts except for a small regulated Dutch trading port at Nagasaki (Tabb 1995). Other than the trade with Dutch, Japan had been avoiding interactions with most of the foreign countries and afraid of being explored, which Tabb (1995) points out that Japan was the only nation in the world to avoid being dominated by Western imperialism.

Before the Meiji Restoration in 1868, premodern Japan was basically a feudal society and typical preindustrial Asian country (Crawcour 1989). According to Crawcour (1989), the population in the 1800s was approximately 30 to 33 million; some 80 to 85 percent of this population lived in rural villages. Conversely, about 2 million lived in three large cities which were Edo, Osaka, and Kyoto. For the administrative purpose under Tokugawa, most of the population was divided by four major classes; samurai, farmers, artisans, and merchants (Crawcour 1989).

When Commodore Matthew Perry arrived in Japan with the American navy's Black Ships in 1853, he forced Japan to open the country and imposed unequal treaties. When the Tokugawa Regime was threatened by a foreign country, it started its collapse (Tabb 1995; Chen 2000). Japan was the country which had been isolated for about 250 years and had not been invaded for 1,200 years (Tabb 1995). The approach of Perry, the foreign military power followed by diplomats and merchants (Cohen 2000), had given Japan a powerful motivation to reconsider their own governance and how they needed to prepare for further approaches from the foreign countries.

Japan actively began learning from the Westerners. They started visiting major nations of the world including the United States and Europe (Tabb 1995). The Iwakura Mission had more than 100 members, and they traveled about a year and nine months (Tabb 1995). What the Westerners made them realize was that radical and fundamental changes were needed for Japan to allow them to catch up with the Western countries and stand on an equal footing with them in terms of technological innovation and increasing knowledge of international politics and culture (Tabb 1995). Iwakura, in fact, was a shrewd judge of current events and Japan's possibilities (Jansen 1989). He wrote that "to

restore national prestige and handle the foreigners, the country would have to be united and ‘for policy and administration to have a single source, the Court must be made the center of national government’” (Jansen 1989:353).

The contact with the West and the efforts of the significant leaders in Choshu and Satsuma resulted in the Meiji Restoration. The Meiji Restoration was the period when the old orders, the tradition bound Tokugawa period, were transformed, and it brought significant social changes in many ways (Tabb 1995). Under the Meiji governance, Japan developed “public administration, maintained a top-down paternalism with strong remnants of a feudalistic sense of obligation, devotion to duty, and hard work, patriotism, nationalism, mercantile regulation, and subsidy to promote industrial growth” (Tabb 1995: 64). In addition, the Meiji governance created a strong central authority improving their national military power (Cohen 2000).

According to Iriye (1989), Japan was transforming itself as a modern state during 1868 to 1912 under the Meiji emperor’s rule. This was the time when Japan was reforming and establishing social structures to be a modern state. The internal administrator, Tokugawa regime, was totally replaced with the new Tokyo government which established a bureaucratic structure (Iriye 1989). The new ruling elites in the government were mostly former samurai who had been active in former bakufu (government) before the restoration and who had been to Western countries to study to help establish new bureaucratic institutions in Japan, such as the ministries of Finance, Home Affairs, and Foreign Affairs (Iriye 1989). One of the features of this replacement was to have the Tokyo government as a central authority of Japan administratively and

politically, instead of the old ways of localism, so that all the experts and professional bureaucrats would be able to play an important role (Iriye 1989).

Stressing administrative centralization was another important key for developing a national economy (Iriye 1989). The Meiji government focused on proving national leadership for national development in order for the country as a whole to “increase production and create industry” (729); this was one of the slogans at that time (Iriye 1989). As administrative roles, they reformed taxation to gain revenue from the agricultural sector and utilize it for industrialization; merchants and industrialists were protected by the government so that they established model industries and provided a quality inspection station (Iriye 1989). People were taught the idea of “enriching the country and strengthening its defense” (729) while establishing corporations in the new policies (Iriye 1989).

Iriye (1989) discusses several important points which the behavior of Japan during the Meiji governance fitted into the general patterns of the modern Western states. Strengthening their military power was one of the patterns of the modern states, and what was unique about Japan was to be the first non-Western state which recognized military and imperialistic powers (Iriye 1989). While mass incorporation had been growing, the government attempted to strengthen the military in order to have it as a backbone of the modern Japanese nation (Iriye 1989). The government focused on including educated and enlightened citizens in the military; therefore, education was highly emphasized in school, political, and professional activities (Iriye 1989).

Another important behavior of Japan which fitted into the pattern of modern states was a territorial entity (Iriye 1989). In terms of geographical entry from center to

periphery, Japan established clear national boundaries from the north, Hokkaido, and to the south, Ryukyu (Iriye 1989). Establishing effective foreign policies and revising treaties with Korea and China with the aim to fully mobilize domestic resources was possible with the power in a modern state (Iriye 1989).

The fear of the power of the West was also one of the factors which gathered people together for the restoration and started opening of the country for modernization. Iriye (1989) analyzes that in the process of modernization, Japan had learned from many nations by modeling the patterns of national development. The models were not only found in one nation, but include Britain, Germany, France, and the United States (Iriye 1989). Tabb (1995) points out that Japanese economic development was achieved through learning from the West while maintaining Japanese styles and cultural aspects of collective norms and spirit. Japan maintained its pride in Japanese identity, unity, and purity which were symbolized by the emperor (Tabb 1995).

Another focal point of Japanese development is argued to be after World War II when Japan attempted to recover from the loss caused by losing the war. After the end of WWII to March 1952, Japan was under the occupation of the United States and lost their sovereignty and self-control over the nation (Inkster 2001). The control over the Japanese nation was in the hands of the Supreme Commander for the Allied Powers, SCAP (Inkster 2001). One of SCAP's first foci was to destroy the Japanese military potential of their industries; SCAP focused on the destruction of Japanese imperialism and abolition of the armed forces. SCAP introduced a highly progressive property tax, the fostering of democratic and labor institutions, the liberalization of the educational system, and the amendment of the election laws of to allow female suffrage (Inkster 2001). The land

reform of 1947 and the anti-trust and anti-*zaibatsu* laws were other important changes (Inkster 2001). These profound institutional innovations right after WWII had an effect on the Japanese economy and development (Inkster 2001).

Some scholars argue that foundation of Japan's rise after WWII was the low-cost raw materials which Japanese firms turned into cars, ships, electronics, and other industrial products; these contributed to Japanese economic development (Ciccantell and Bunker 1995; 2005). Japanese firms were supported by the United States and World Bank financial assistance which created an industrial development plan based on steel, shipbuilding, and shipping industries (Ciccantell and Bunker 2005). The steel industry provided the raw material foundation, and it reduced the cost for many other sectors of the Japanese economy (Ciccantell and Bunker 2005). Ciccantell and Bunker (2005) argue that this transformed Japan into the world's second largest economy and the United States' economic competitor. Also, the high rate of importing raw materials and the interactions with other industrial nations allowed a fast-growing Japanese economy (Inkster 2001).

Japan shared in the golden age years from 1952 to 1973. This period was when Japan experienced unprecedented growth and prosperity for one of the advanced nations (Inkster 2001). The advanced nations, stimulated by industrialization, experienced high growth in national income, national income per head, manufacturing, capital formation, labor productivity, and exports (Inkster 2001). By the end of 1980s, Japan had become the world's largest creditor and exporter of capital (Inkster 2001).

### *Japan as a Core Country*

Wallerstein (2002) argues Japan is one of the last nations among all other nations to incorporate into the capitalist world-economy. Pointing out the major focal point of Japan's development which was the corruption of Tokugawa regime and the rise of the Meiji Restoration, Japan's entry of capitalist world-economy happened during the nineteenth century (Wallerstein 2002). During this period, they allowed the entry of the West into Japan, and Japanese elites attempted to rapidly change within the nation (Wallerstein 2002). They had to seek ways to defend themselves and gain an advantage in the modern world-system (Wallerstein 2002). Having learned from Western countries, the actions they took were the "selective import of 'modern' technologies, economic and political, to create a regime that would not be entirely submerged by outside pressure; and the creation of a modern military structure" (Wallerstein 2002: 1). Also, Kawakita (2016) points out that the period when Japan was closed and ended all foreign contact, like the Soviet Union with its Iron Curtain, it remained in a semi-periphery position in the world-system.

What was unique about Japan's entry of capitalist world-system was that instead of allowing the Western powers to invade the nation, Japan became one of the "carvers" who defeated China in 1895, won a war with Russia, conquered Korea, declared war on Germany in 1914, and joined the First World War (Wallerstein 2002). In addition, by the time of the Second World War, Japan possessed a major world military power (Wallerstein 2002). The defeat of the Second World War was a terrible loss and impairment to Japan which resulted in a substantial loss of Japanese people, massive devastation caused by atomic bombing, and the destruction of a part of their industrial

infrastructure (Wallerstein 2002). The defeat and the U.S. control led to a significant change in the Japanese military and an introduction of a liberal parliamentary regime (Wallerstein 2002).

Wallerstein (2002) points out the needs of the U.S. in the Cold War with the Soviet Union was an opportunity and advantage for Japan to grow their economy; and in 25 years, Japan grew from being a semi-periphery country to one of the core countries joining the economic giants of the world-economy (Wallerstein 2002). Since this transformation was extremely rapid and extraordinary, it is impossible to reverse their position in the world although Japan had experienced economic difficulties in 1990s, which did not cause the nation to change their position as playing a major role in capitalist accumulation in the capitalist world-economy (Wallerstein 2002).

Today, Japan stands as the fourth largest economy in the world after China which stands in first place and India, the third as of 2014 (World FactBook 2014). Having a life expectancy rate at birth of 84.74 years, Japan is one of the top countries where people live very long (World FactBook 2014). At the same time, one of Japan's current concerns is its low birth rate which is 1.4 children born per woman in her lifetime (World FactBook 2014). Japan's unemployed rate in ages from 15 to 24 is 7.9% (World FactBook 2014). Currently Prime Minister Abe is attempting to gradually raise the consumption tax rate; the government raised it from 5% to 8% in 2014 and is still aiming to rise it to 10% in order to help government revenue so that they are able to plan to reform the economy and deal with the large government debt (World FactBook 2014). Currently, low-birth rate, a large aging population, and shrinking population are Japan's major challenges for their economy (World FactBook 2014).



## **METHODOLOGY**

In this study, comparative-historical method is utilized with the focus of within-case method including a subtype of causal narrative. Comparative-historical method has several advantages which “employ comparison as means of gaining insight into causal determinations” (Lange 2013:14), and “pursue causal explanation, and analyze units of analysis at the meso- or macro-level” (19). In order to examine macro level of causal explanation of how experiences of the earthquakes will differ in society of Haiti and Japan, comparative-historical method is an effective approach to provide a holistic idea and background to each country’s society today with their different experiences with the earthquakes.

Causal narrative is “a detective-style within-case method and an analytic technique that explores the causes of a particular social phenomenon through a narrative analysis; that is, it is a narrative that explores what caused something” (Lange 2013: 43; 117). With the focus of causal narrative, this research attempts to examine and explore the causes of different experiences to the earthquakes in Haiti and Japan. Also, Wallerstein’s world-system perspective is the main theoretical framework to examine the different historical processes of Haiti and Japan, and to investigate historical origins and explanation to the different disaster experiences. The focus is to seek a holistic explanation to current situations to each county with utilizing the role and notion of core and periphery in world-system perspective.

### ***Data Collection***

The sources for conducting this research are collected from historical documents from both primary and secondary sources. The majority of primary data is collected from

the government documents which determine specific statistics of loss and damages caused by the earthquakes in terms of population, economics, and social and individual effects, such as housing and infrastructure in communities. The secondary sources are collected from scholarly research literature on the earthquakes that occurred in both Haiti and Japan, as well as newspaper articles, print media, government documents, ledgers, and books published after the earthquakes. From those secondary sources, this research will also seek to discuss differences of the social and political structure, economic opportunities, and demographic characteristics based on the assumption of different outcomes which already existed historically between core and periphery countries.

## **RESULTS AND DISCUSSION**

### ***The Earthquake in Haiti and Problems Caused***

The 7.0 Haiti Earthquake occurred on January 12, 2010, and it struck very close to the capital, Port au Prince. It caused a death toll of over 220,000 people (2% of the population) and about 300,000 people were injured (World Bank 2011; IASC 2010). The Inter-Agency Standing Committee (2010) points out that these numbers of deaths, injuries, and homelessness caused by the earthquake were far greater than in other recent cases of devastating earthquakes such as the earthquake in China which had a 7.9 magnitude in 2008, a 6.3 earthquake in Italy in 2009, and an 8.8 earthquake in Chile in 2010. Because it occurred in the highly populated urban area with few earthquake resistant buildings, the earthquake in Haiti was more destructive (IASC 2010).

According to United Nations (2011), the estimated number of people who were displaced was 2.3 million people including 302,000 children. Due to the earthquake, at least 188,383 houses were severely damaged and 105,000 were destroyed, including 80

percent of schools in Port-au-Prince and 60 percent of schools in the South and West districts (United Nations 2011). Approximately, 30,000 commercial and public buildings, such as government buildings, municipal administration buildings, and the Port-au-Prince Cathedral, were severely damaged as well (IASC 2010). The communications infrastructure was considerably damaged, including many debris blocked roads, and damage to submarine telecommunications cable (IASC 2010). In addition, Haiti's health system was damaged. Sixty percent of the hospitals were either severely damaged or destroyed, and the only national teaching and reference hospital and the Ministry of Health building were not spared, causing the deaths of more than 200 staff (IASC 2010).

The earthquake caused a loss and urgent reconstruction cost of about \$11.5 billion since it destroyed about 80% of Port-au-Prince (International 2010). According to the March 2010 Post Disaster Needs Assessment, the estimated damages and losses of the country was \$7.8 billion with reconstruction needs of \$11.5 billion. Haiti's earthquake resulted in the highest economic cost caused by a disaster in the last 35 years (World Bank 2011). When the earthquake struck, Haiti was already suffering and recovering from storms in 2008 which caused 800 deaths and over \$1 billion in damages (International 2010); therefore, the earthquake continued to make more people suffer due to the severe poverty and increased number of crimes, such as violence and sexual abuse in Port-au-Prince (International 2010).

Regarding those problems caused by the earthquake, Inter-Agency Standing Committee (2010) argued that considerable issues already existed in Haiti prior to the earthquake. For example, urbanization in the city and metropolitan area in Port-au-Prince, a lack of skills in the building of concrete structures, a lack of ability to maintain old and

aging buildings, and the non-reinforcement of building codes were already serious problems (IASC 2010). Other problems included a lack of control and regulation over self- and contractor-built constructions, a lack of land use and urban planning, as well as a lack of knowledge of risk zoning (IASC 2010). All of these problems had triggered increases in vulnerability of the urban areas (IASC 2010). Roads in slums were unpaved or easily damaged during the annually rainy season, and most of them did not even have a road system (IASC 2010).

The problems caused by the earthquake in Haiti were countless. Haiti experienced one of the most devastating earthquakes which caused significant human costs including many displaced people, destroyed infrastructure, and impaired functioning of its government. The important key associating this earthquake and the country is that Haiti had already been suffering its own issues. The issues were deprivation and vulnerability which have been caused by a high poverty rate, high unemployment rate, and being an economically and politically weak country. The 2010 earthquake occurred in the social context of the country's extremely vulnerable situation and its systematic poverty. Therefore, the suffering of Haiti's people from the earthquake is situated in the context of the majority of the population already suffering from the vulnerability and systematic poverty.

### ***The Earthquake in Japan and Problems Caused***

The Great East Japan Earthquake which, struck on March 11, 2011 at the north-eastern coast of the main island, resulted in three sequenced events. They are the massive earthquake, tsunami, and the incident at the nuclear power plant (Arase 2012). The earthquake's magnitude was 9.0, and it is recorded as the largest earthquake in Japanese

history (Kumaresan 2011; Cabinet Office 2015). The 2011 earthquake triggered the largest recorded tsunami which caused massive problems for not only human life and health but also transportation and communication in the region (Kumaresan 2011; Cabinet Office 2015).

The death toll was 15,893 and 6,152 were injured, according to the Cabinet Office, Government of Japan, and as of September 2015, still 2,573 people were missing. About 470,000 people evacuated right after the disaster (Cabinet Office 2015). Comparing with the Great Hanshin Earthquake in 1995 that caused 6,434 deaths (Cabinet Office 2015), the Great East Japan Earthquake and the subsequent tsunami caused a massive effect which Japan had never experienced.

More than 1,146,772 buildings in the area were either fully destroyed or partially damaged (Cabinet Office 2015). Also, transportation (roads, trains, and airplanes), lifelines (power, gas, and water), and communication systems were destroyed. The total estimate of reconstructing the infrastructure was \$1.4 trillion (Cabinet Office 2015).

The tsunami hit the Fukushima Daiichi Power Plant 40 minutes after the earthquake which struck the coast of the Pacific side of the Tohoku region, and the plant was swept and sank by a large tsunami wave (NAIIC 2012). The earthquake damaged power transmission grids from Shin-Fukushima Electrical substation of Tokyo Electric Power Company, TEPCO, to Fukushima Daiichi plant, and cut the electricity supply (NAIIC 2012). The power plant was connected to a backup nuclear line in case of an emergency from Tohoku Electric Power, but this failed to function due to a cable connected to a metal-clad type switchgear for Unit 1 (NAIIC 2012). This resulted in losing all its off-site power for the plants (NAIIC 2012). The tsunami's massive damage

attacked not only the power supply systems, but it washed away vehicles, heavy equipment, heavy oil tanks, dirt, and other debris and broken pieces of the building (NAIIC 2012). A large amount of seawater flooded all of the key buildings of the power plants; this resulted in a severe situation where workers were significantly hindered in responding to the damage and emergency (NAIIC 2012). Among those workers, it was very difficult to respond to the emergency and make decisions since communications including the main control room, monitoring, control, and lighting of the plant facilities were completely lost (NAIIC 2012). They were forced to deal with the accident and make spontaneous decisions without having much information, such as effective measures and procedure manuals (NAIIC 2012).

The major obstacle they confronted was the loss of power which made it extremely difficult to cool the reactors in the allowed down-time since the process of cooling down the reactors and shutting them down required power to be available (NAIIC 2012). The plant lost the main control room functions which caused them to lose access to multiple methods that could have led to a safe shutdown (NAIIC 2012). Although the reactor cores and fuel storage pools need constant cooling, Unit 1 failed to remain cooling its reactor (Arase 2012; NAIIC 2012). The reactor of Unit 1 exploded, blowing off the top of the building, damaging the cables, and injuring five workers (Arase 2012, NAIIC 2012).

The earthquake and tsunami caused a very serious accident at the Fukushima Dai-ichi Nuclear Power Plant and Dai-ni Power Plant. A large amount of radioactive materials was released from the Fukushima Dai-ichi Nuclear Power Plant both into the air and the ocean. The problem of radioactive contamination was very serious, and

concerns were not only about the health of people who live near the nuclear power plant including children, but also damage to the agricultural products, livestock, and marine products, and increased anxiety among the consumers (Investigation Committee 2012). In addition, it was certain that the accident shocked many countries in the world, and especially, the discharge of contaminated water to the ocean elevated concern and criticism from the international community (Investigation Committee 2012).

The problems caused by the earthquake in Japan included the loss of many people and people's property, which the tsunami destroyed. Many people lost their family members and homes, and also many of them were not able to come home due to the radioactive contamination. The exposure level to radiation and its effect on one's life had been a controversial issue which Japan had knowingly faced as an industrial country holding nuclear power facilities (Onani and Shirabe 2013).

### ***Problems Caused as a Core and Periphery Nation by the Earthquake***

Comparing the earthquakes that occurred in Haiti and Japan, one major similarity is the degree of devastating effect on their infrastructure, people, and the length of time and endless effort they would need toward recovery of their societies. The aftermath and issues caused by the earthquake in Haiti were severe. More people lost their lives and many more people needed to seek safe places to shelter. Haiti, as well, was unable to see a fully recovered society. A part of the explanation for their vulnerability is being historically deprived and economically and politically unstable. Their recovery was focused almost exclusively on their infrastructure, providing places to live for those who had been living in the camps, and hopefully providing employment to allow them to live on their feet. On the other hand, Japan, as an industrial nation relying on nuclear power

development, the aftermath of the earthquake and tsunami was a catastrophic disaster. Japan is forced to struggle with the accident of Fukushima Nuclear Power Plant and its radioactive contamination.

### ***Dealing with the Problems***

#### ***Haiti***

##### ***International aid and humanitarian agencies***

There were a number of humanitarian agencies who responded to the earthquake including neighboring countries, Dominican Republic and other Latin American and Caribbean countries. Right after the earthquake, International Search and Rescue Advisory Group (INSARAG) started to arrive in Haiti. Twenty-seven countries offered teams, including three that were already in the country (Iceland, Dominican Republic, and the US) within 24 hours, and within 48 hours, six teams were operational (IASC 2010). A total of 26 teams arrived in Haiti by January 15, and they had saved a total of 134 people, which was the highest number of lives rescued by INSARAG recorded, until the Government called off the search for survivors and INSARAG left Haiti on January 23 (IASC 2010).

United Nations Stabilization Mission in Haiti (MINUSTAH) had been working in Haiti since 2004, and before the earthquake, there were about 7,803 troops, 2,136 UN police, 464 international civilian staff, 1,239 local civilian staff, and 207 UN Volunteers (IASC 2010). As the first challenge of those humanitarian communities, it was reported that there was a limited capacity to respond to the earthquake because those staff were also affected by the large number of losses in their institutions. Within MINUSTAH, there were over 100 staff killed including many more staff injured (IASC 2010).



MINUSTAH's logistics base was also used for the central hub for other international humanitarian communities due to its convenient location to the airport, basic infrastructure, viable telecommunications, and security (IASC 2010).

The first team of United Nations Disaster Assessment and Coordination (UNDAC) arrived on January 12 within 24 hours after the earthquake (IASC 2010). They mainly established an Onsite Operations and Coordination Center, worked to assist local authorities and humanitarian actors working in response, and conducted an assessment of the initial damage and effect of the earthquake (IASC 2010). Another international humanitarian community involved in the response was the Organization for the Coordination of Humanitarian Affairs (OCHA), and it estimated that about 400 humanitarian actors were operational by the end of January (IASC 2010). Also, Real Time Evaluation reported there were about 2,000 humanitarian communities that worked in various fields in the response (IASC 2010). The estimated number of humanitarian actors who worked in Haiti varied, but it showed that Haiti was largely dependent on international support in the response to the earthquake.

Support from international military was another significant response for Haiti. According to IASC (2010), there were 26 countries, such as Argentina, Canada, France, Russia, the United Kingdom, and the US, who provided their military support in various fields including hospitals, troops, military aircraft, hospital ships, cargo ships, port handling equipment, and helicopters. Among those, IASC (2010) reported that Canada, the US, and the Dominican Republic offered the largest contingents. For example, the US Navy had 17 ships, 48 helicopters, and 12 fixed-wing aircraft right after the earthquake including 10,000 sailors and Marines, and provided 336 air deliveries delivering 123,000

liters of water, 532,440 bottles of water 111,082 meals, and 4,100 kg of medical supplies (IASC 2010).

Donations also were provided from various humanitarian donors. Many donors formed a Humanitarian Donor Group, including the United States Agency for International Development, the Humanitarian Aid Department of the European Commission, the Canadian International Development Agency, the UK Department for International Development, Spanish Cooperation (IASC 2010). As a role of these groups, they organized and guided key issues and strategies focusing on developing common messaging on major areas of concern (IASC 2010).

Because of prompt response of many humanitarian agencies, the emergency response operation needs were met for a great number of people in the first six months (Patrick 2011). According to The Inter-Agency Standing Committee (2010),

- 4 million people received food
  - 1.2 million had access to safe water daily
  - 1.5 million people received emergency shelter materials
  - 2.1 million household non-food item kits were distributed
  - 11,000 latrines installed
  - 90% of displaced people in Port-au-Prince had access to adjacent health clinics
  - 195,000 children benefited from temporary learning spaces
  - 550,000 children and pregnant or lactating women received supplementary feeding
  - 1 million people benefited from cash for work
  - 5,900 people relocated from imminently dangerous locations
  - 142,000 people received agricultural inputs for spring planting
  - 2,047 separated children received psychosocial support and 337 were reunited with their families
- (IASC 2010 p.11)

These immediate targets were achieved as the emergency response from many humanitarian communities right after the earthquake.

### *Shelter and displacement*

During 2010, humanitarian partners responded to the emergency shelter needs and provided 117,200 tents, 1,185,052 tarpaulins, and 2.5 million household items including blankets, mats, and kitchen sets for internally displaced persons (United Nations 2011). According to United Nations (2011), the camp management group developed a pilot program and played a role for facilitating the return of 2,714 families. As of June 2011, 73,000 planned transition shelters had been constructed (United Nations 2011).

Severe damage and the situation had not changed for those displaced people after two years since the earthquake (Oxfam 2012). Over 519,000 Haitians still lived in tents and under tarpaulins in 758 camps mostly in Port-au-Prince (Oxfam 2012). In addition, 45 percent of the population suffer from food insecurity, and only a few Haitians could access basic services (Oxfam 2012). One of the issues pointed out about humanitarian agencies transferring displaced people from shelters to permanent housing was that land ownership is obscured with no comprehensive cadaster and private notaries. As a result, humanitarian agencies faced difficulties in building permanent housing since they needed to start by collecting accurate information of the land to avoid troubles (Oxfam 2012). The complexities of land tenure in Haiti hindered humanitarian agencies' efforts to support recovery and reconstruction for people in Haiti (Oxfam 2012).

The other issue regarding building shelters was the earthquake destroyed about 250,000 housing units and dwellings. As a result, humanitarian agencies constructed about 96,000 transitional shelters (t-shelters) and 4,600 new homes, and repaired 6,600 by October 2011 (Oxfam 2012). A critical issue of concern was that t-shelters were not usually stable enough to withstand a severe hurricane in Haiti's seasons (Oxfam 2012).

Humanitarian agencies and international aid tended to focus on immediate and short-term recovery, but some researchers argued for the necessity of long-term recovery when they supported Haiti (Oxfam 2012; United Nations 2011;)

Most people, who were living in the camps, were not able to leave the camps, and this was another difficult circumstance which hindered moving to permanent housing (Oxfam 2011). Unemployment and having insufficient income to meet their basic needs were the major reasons for people not being able to move back to rented, repaired, or constructed permanent housings (Oxfam 2011). Also by living in the camps, they were continuously provided free water, sanitation, health care, and other services. These were not available for them in the previous places destroyed by the earthquake (Oxfam 2011). Therefore, returning home and starting to live on their own, for many camp residents, meant that they would be able to leave the camps only if they were employed with sufficient jobs to pay basic fees after there was some investment in their local communities (Oxfam 2011).

Haiti faced a critical issue because it was not considered for long-term investment to aid displaced people and their futures. Most of humanitarian agencies and international aid provided were to build temporary shelters and tents with basic needs, therefore, there was a lack of resources and effort to remove the rubble of destroyed houses (Oxfam 2011). Most donors did not provide enough funding for large scale rubble removal which was a very important part of recovery process to repair and rebuild housing to allow people to safely move back to their communities (Oxfam 2011). Because of its economic situation, Haiti needed to fully rely on international humanitarian communities and international recovery aid. A large amount of funds had been donated already, but they

were still not enough to support many Haitians to live outside the camps, and Haiti was still waiting for the requested funding to arrive (Evans 2011).

## *Japan*

### *Japanese government and issuing evacuation*

Right after the accident, while dealing with the accident at Fukushima Daiichi Nuclear Power Plant, there were many questions arose about how the Japanese government dealt with it. The government did not understand the seriousness of the accident and the fact that massive quantities of radiation were released into the air and water. The government's response was due, partially, to the delay in releasing the information by the System for Prediction of Environment Emergency Dose Information (SPEEDI) which constructed the environmental radiation monitoring and the graphic data (National Diet of Japan 2012). SPEEDI usually monitored radiation exposure in the air when an accident happened from the nuclear power plant and was supposed to forecast the presence of radiation based on the data about weather and geography (Shirabe 2013).

By using this information, people were able to prepare for exposure to radiation. They could evacuate to a safer zone promptly and take iodine tablets to prevent possible risks of thyroid cancer (Sakiyama 2011). The government and residents should have been informed about the radiation from SPEEDI and issued evacuation orders, but SPEEDI information was not disclosed until March 23, 12 days after the accident (Shirabe 2013). When the information about the exposure to radiation was most needed, the government failed to use and release the information immediately after the accident (Shirabe 2013).

The government issued an evacuation zone originally in an area within a 3 km radius from the power plant, but it was changed to 10 km and again to 20 km by the day

following the accident (National Diet of Japan 2012). On March 15, the evacuation orders to shelter were issued for residents in the zone between 20 and 30 km from the power plant (National Diet of Japan 2012). The night of March 11, when the evacuation order for areas within a 3 km radius of the Fukushima Daiichi Nuclear Power Plant and shelter-in-place order for areas within a 10 km was issued, Chief Cabinet Secretary Edano explained at a press conference about the situation of the power plant and the reasons for evacuation by stating “This order is a precautionary measure, and is an order to evacuate. Currently, there are no leakages of radioactivity outside the reactor. At this time there is no danger to the environment” (National Diet of Japan 2012:15).

On the morning of March 12, when the order was expanded to areas within a 10 km radius from the Fukushima Daiichi Nuclear Power Plant and a 3km radius of the Fukushima Daini Nuclear Power Plant, Chief Cabinet Secretary Enado provided explanations that “... please take note that ordering residents to evacuate to areas outside the 10km radius zone is only a measure taken to provide utmost assurance” (National Diet of Japan 2012:15). Moreover, after the hydrogen explosion at Reactor 1 of the Fukushima Daiichi Nuclear Power Plant had happened and workers started to inject seawater into the reactor (this was when the evacuation order was issued for areas within a 20 km radius of the Fukushima Daiichi Nuclear Power Plant), Chief Cabinet Secretary Edano explained on the night of March 12 that “Although, as with the response policies we have taken thus far, there is no actual danger to residents in areas lying between 10km and 20km from the plant due to the release of radioactivity, we have expanded the evacuation zone to 20km from the plant, considering the fact that new response measures

may be taken, for the sake of taking full precautionary measures” (National Diet of Japan 2012:15).

Problems with evacuation orders were caused when the government kept expanding the evacuation zone and informing residents, not about the actual situation, but that those zones were precautionary measures for a possible severe situation in the near future. While the government was expanding the evacuation zones as precautionary measures, there was increased anxiety and frustration among residents who did not exactly know what they needed to do to protect themselves.

### ***Residents near Fukushima Nuclear Power Plant and SPEEDI***

The members of the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission conducted a survey of approximately 14,000 residents living near the nuclear plant, including workers. As results of the survey, they found problems with evacuation orders from the residents’ perspective. When the national government issued evacuation orders after the accident, the local governments informed the residents about it (National Diet of Japan 2012). Most of residents evacuated promptly, but because the evacuation order was sudden and they did not know much information about the accident, many of them went to evacuation shelters with “little more than the clothes on their backs” (National Diet of Japan 2012:14). From the survey, it was found out that most of the residents did not know the evacuation was because of the nuclear accident and thought that they would be able to come home soon (National Diet of Japan 2012). Many of them mentioned that they would have made the minimal preparations, such as taking their valuables with them, if they have known that

the evacuation was due to the nuclear accident and they might not be able to return home again (National Diet of Japan 2012).

It was clear that the government mentioning the evacuation was a precautionary measure made those evacuees confused about evacuation, and the government failed to provide useful information based on the residents' needs (National Diet of Japan 2012). By constantly expanding the evacuation zones, the government forced evacuees to relocate. There were many evacuees who had to move to another shelter more than six times (National Diet of Japan 2012). In the survey, many evacuees mentioned that they were disappointed and felt helplessness because of the confusion the government created by expanding the evacuation zones several times. Many residents surveyed said they were exposed to a high dose of radiation when they followed the initial evacuation order (National Diet of Japan 2012). Approximately 10 to 15 percent of evacuees left areas where they later found out there was a high level of radiation (National Diet of Japan 2012; Shirabe 2013). Those, who unknowingly evacuated later, discovered that they had been to the areas with a high dose of radiation. As a result, they experienced psychological stress and started to be concerned about the effects on their health (National Diet of Japan 2012).

Regarding the criticism of how the government caused confusion about the evacuation and the fact that the data of SPEEDI was not disclosed when most needed, the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission explained the reason of late disclosure of the data of SPEEDI and the confusion that the government made.



When an accident occurs, the SPEEDI system starts to calculate predictive radioactive diffusion. SPEEDI collects ‘release source information’ which was “the amount of radioactive material that was being released from the nuclear facility into the atmosphere by nuclide and time” (National Diet of Japan 2012:55) from Emergency Response Support System (ERSS). When the Fukushima Daiichi Nuclear Power Plant stopped, ERSS also shut down because the external power supply was lost and other important devices did not work due to the loss of electric power supply (National Diet of Japan 2012). Since ERSS did not have the ability to calculate release source information, SPEEDI also was not able to start calculating the diffusion of radioactive materials (National Diet of Japan 2012).

When the government released the information from SPEEDI on March 23, the information about the diffusion of radioactive materials and dose levels were not accurate (National Diet of Japan 2012). SPEEDI’s calculations were inaccurate because the information from ERSS was not available, and the Nuclear Safety Commission did the calculation based on inverse estimations of the past situations of how the diffusion of radioactive materials occurred (National Diet of Japan 2012). Therefore, although the data of the diffusion of the radioactive materials right after the accident was finally available from SPEEDI on March 23, it was not accurate. Since the government was not able to reach the data from SPEEDI and did not know how and where the radioactive materials diffused, the evacuation zones were expanded several times without knowing exactly how far the residents needed to evacuate. This caused a serious burden to the residents and unnecessary exposure to radiation among evacuees.

***Facing risks and concerns without end***

The government's approach to the accident at Fukushima Nuclear Power Plant created confusion among the government itself and the residents living near the power plant. When the government kept expanding the evacuation zones, the government was unclear about the situation since the accident was catastrophic, and the risk of a nuclear power plant explosion is perceived as minimal. Due to the accident, radiation and contamination were the most difficult problems to deal with. According to the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission, approximately 900 Peta Bq of radioactive substances were released from the accident (National Diet of Japan 2012). After the accident, approximately 150,000 people evacuated (National Diet of Japan 2012). Of those 78,000 evacuees were from the restricted area (within a 20-km radius from the Fukushima Daiichi Nuclear Power Plant) and about 10,010 evacuees were from the deliberate evacuation area which was outside the 20-km radius from the nuclear power plant (National Diet of Japan 2012). This was also an area with concern that the cumulative air dose might reach 20mSv per year after the accident (National Diet of Japan 2012).

After the accident, the government changed the acceptable radiation exposure rate to 20mSv from 1mSv per year (Reconstruction Agency 2012; Starr 2013). For this accident, the government decided to use 20mSv per year as the acceptable radiation exposure dose based on the International Commission on Radiological Protection (ICRP) statement in the ICRP Publication 103 (Reconstruction Agency 2012). The ICRP recommended its exposure range from 100mSv to 20mSv per year for emergency exposure situation, such as a nuclear facility accident and had each nation determine the

acceptable radiation dose based on their circumstances (Reconstruction Agency 2012).

The government decided to use the lowest dose of exposure, 20mSv, for the evacuees and Fukushima prefecture with the aim to gradually decrease the exposure dose after decontamination (Reconstruction Agency 2012).

The ICRP also recommended an exposure dose of 1mSv to 20mSv per year for the accumulated dose of radiation in daily life (Tsuziuchi 2016). Therefore, although 20mSv was still in the range of emergency exposure situation based on the ICRP Publication 103, the government set 20mSv as the acceptable dose for the evacuees to return to their home and had the dose of 1mSv as an ideal dose aim after decontaminating the areas (Tsuziuchi 2016). In order to deal with the problems of exposure to radiation, the government decided not to evacuate those areas with radiation doses of more than 1mSv, but chose to raise its acceptable radiation dose to 20mSv (Starr 2013; Tsuziuchi 2016).

The government raised the acceptable radiation dose, but it did not mean people were still safe, and there were no concerns for health effects if people were exposed under 20mSv per year. Several researchers insisted that there would not be a safe dose to be exposed to radiation, and low levels of radiation could cause cancer (Caldicott 2014; Sakiyama 2013; Starr 2013). Each dose could increase the risks of developing a malignancy or genetic disease when they were accumulated (Caldicott 2014). Also, Caldicott (2014) argued that high doses of radiation exposure from the nuclear meltdown accident like the Fukushima Nuclear Power Plant and a nuclear weapon explosion, had the possibility to cause acute radiation sickness, such as hair loss, severe nausea, diarrhea, and bleeding. Although the government argued that the data from SPEEDI released after

the accident was not accurate, the SPEEDI did show radiation doses of more than 100mSv in the air near the Fukushima nuclear power plant right after the accident (Sakiyama 2011). The high radiation levels caused great concern for the health of those residents living by the power plant.

The exposure was not only caused by the radiation in the air. The released radioactive cesium from the accident was also deposited in the soil. Approximately, 8 percent of Japan's land was contaminated by the fallout of radioactive plumes (Fairlie 2013). Starr (2013) discussed that the primary route of internal exposure usually happened through eating foods contaminated with cesium-137, and this bioaccumulates in human bodies, plants, and animals. Although the government stated that areas were safe enough to return and foods were safe enough to eat after decontamination of the land, the interviews conducted by Tanaka (2016) showed that many people who were once evacuees and returned to their home expressed their concern and anxiety about being exposed especially among those who were raising their children.

As an industrial nation with nuclear power plants, Japan faced the risks associated with nuclear energy. When Japan chose to utilize nuclear energy as energy source, the nation accepted a terrible burden for those living around the nuclear power plant and the workers (Koide 2014). The Japanese government had been trying to clean the radioactive contamination, but in reality “all that can be done is to collect it, place it in containers – usually plastic bags – and transfer it to another location” (Caldicott 2013:10). The main question became where to store the nuclear waste safely away from places where it would not affect human and environment for thousands of years (Caldicott 2013), and the government had yet to find an answer for it.

*World-System Influence for Different Outcomes Resulting from Haiti and Japan's Earthquakes*

As a peripheral country dependent on other nations, Haiti has not been able to develop their own economy and establish stable political structure, therefore Haiti has remained in poverty and vulnerability since their colonial period. When the earthquake occurred, Haiti experienced a devastating effect on its infrastructure, and its recovery was exclusively focused on providing water, food, and safe places to shelter. Since Haiti is not able to recover its society, it is still a highly dependent country which waits for humanitarian agencies and international aid provided by other nations. By being dependent on other nations, Haiti is not able to see a fully recovered society and would not be able to be an independent nation which could serve their own people and needs with sustainable economic performance and stable politics.

Japan, as a core nation in the world-system, is characterized by high technology, which influences the development of nuclear facilities. Japan's response to the earthquake necessitated dealing with the accident of Fukushima Nuclear Power Plant and its endlessly leaking radioactive contamination. In addition, Japan needed to rebuild the infrastructure of those places where the earthquake and tsunami devastated. Comparing the response of Haiti and Japan, it is clear that the assumption of Risk Society only applies to the society of Japan. Being a highly industrialized nation with a strong economic position implies that it is always associated with risk of its development since high levels of modern technology and industrialization always contain risks which have global effects and do not have limitations in time and space. The fact that the Japanese government has yet to find solutions to deal with the radioactive contamination is an

example of Risk Society. The radiation threat is associated with the risks forced by core nations as a result of their core processes. Haiti, a peripheral nation, is not able to afford these risks since it is unable to develop modern technology.

## **CONCLUSION**

This research investigated the importance of historical factors for different societies after a disaster. Utilizing comparative-historical methods, this research was able to approach the subject from the historical background and events connected to today's societies. Wallerstein's world-system perspective helps understand the different historical processes of Haiti and Japan including how periphery and core nations differ in their response to the earthquake.

Some advantages of utilizing comparative-historical method for this study are those large historical documents available to gain information for both countries and its flexibility to utilize and analyze the information when needed. At the same time, one of the challenges is the limitation of the knowledge and a lack of skill of the researcher to effectively analyze the information. The way some information was utilized could be biased based on how the researcher desired to bring it the discussion, and when this occurred, some other information would be left out although it was also important to include in the discussion.

The findings of this study showed the importance of paying attention to a holistic understanding of a single event happening today. Different degrees of effects of an earthquake to a society are not just determined by whether a nation is a high-income or low-income country. Physical conditions and the social structure which have been developed by a nation through its history are necessary to the analysis, including the

possible continuous struggles the nation would need to face. This is why Haiti would not need to worry about radiation contamination and its effects on human bodies caused by a nuclear power plant, and Japan would not need to wait for international aid to support their own people, although the earthquake and tsunami was catastrophic. Comparing Haiti and Japan, Japan has shown much faster recovery after the earthquake in terms of its social structure, but it will have to continuously seek to deal with the contamination and its threat to human bodies, and the Japanese government does not know how long it will take.

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